PATENT ABSTRACTS OF JAPAN

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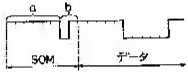
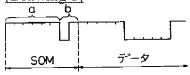
(54) SYNCHRONIZING SYSTEM IN MULTIPLEX TRANSMISSION SYSTEM



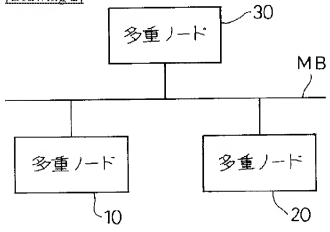
(57)Abstract:
PURPOSE: To prevent step-out and a bit error which follows it, and to enhance reliability of multiplex transmission by taking surely synchronization without depending on a variance of a reference clock of each multiple node, even if the same code as a start code is continued.
CONSTITUTION: A start code (SOM) of a message frame transmitted to a multiplex transmission line is constituted of a special code (a), and a special bit pattern (b) of passive and dominant, frame synchronization is taken at a rise of the special code (a), and thereafter, moreover, synchronization is taken again at a rise of the special pattern (b).

DRAWINGS

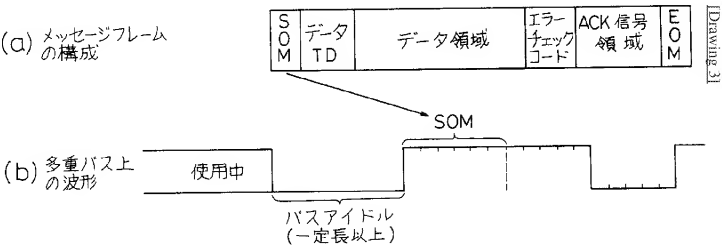
[Drawing 1]



[Drawing 2]



[Drawing 31]


(a) メッセージフレームの構成
SOM
データTD
データ領域
エラーチェックコード
ACK信号領域
EOM
SOM
(b) 多重バス上の波形
使用中
バスアイドル
(一定長以上)

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the synchro system in the multiplex transmission system which used what is called a non-destroying mediation type CSMA/CD (Carrier Sense Multiple Access/Collision Detection) transmission system.
[0002]
[Description of the Prior Art]In recent years, increase of a unit and the problem of hypertrophy of harness have arisen with rapid progress of car electronics. Many problems of these transmission systems are solved and distributed control type LAN (local area network) is variously proposed as a high multiplex transmission system for cars of reliability and flexibility. especially, non-destroying mediation type CSMA/CD which satisfies the requirements for an open system (for example, -- the same -- a type of a car -- grade difference -- forcing -- etc. -- it is not necessary by a variation to change other nodes even if there are an addition and deletion of a node), a response, and flexibility attracts attention, and it is used widely.
[0003]In this non-destroying mediation type CSMA/CD transmission system. Each major node is drawing 3 (b). If the condition of use of the multiplex transmission line (multiplex bus) which consists of twisted pair wires etc. is completed and the empty (idol) state more than fixed length is checked so that it may be shown, the data transmission for every frame will be started in the above-mentioned idle state. And the transmission waveform of a local station is compared with the waveform on a multiplex bus for every bit, in being inharmonious, it is judged as the collision of a signal and suspends transmission, and it returns to the check of the above-mentioned idle state. Since the waveform on a multiplex bus of the major node which has transmitted the signal with a high priority was the same as that of the signal of a local station, transmission was continued as it was, without detecting a collision.
[0004]Since the transmission distance which is a special feature of a car being short, and access speed are comparatively slow and each major node can observe the signal on a multiplex bus simultaneously, a non-destroying mediation type CSMA/CD transmission system, It excels also in the point that the utilization ratio of a circuit does not need complicated control procedures, such as the random back off, well. The message format of the above-mentioned frame, Usually, drawing 3 (a). SOM (Start Of Message) which shows the start of a message so that it may be shown, Data ID which shows the contents of the following data, the data area of predetermined length, error check codes, such as CRC, and all the major nodes to bit correspondence -- reception confirmation signal (ACK signal). EOM (End Of Message) which shows the ACK signal field for making it return, and the end of data ** -- it has composition to say.
In the above-mentioned transmission system, when identical codes carried out predetermined bit continuation, the digital transmission system which certainly carries out 1 bit inserting of reversal numerals and what is called the staff bit was used for frame data.

[0005]Therefore, a receiving major node detects the standup of SOM of the message first transmitted on a multiplex bus, takes the synchronization of a frame in the above-mentioned standup, and retakes a bit synchronization by the rising edge of data after that.
[0006]

[Problem(s) to be Solved by the Invention]However, in the above-mentioned transmission system SOM of a message, Drawing 3 (b) It is a special code of a 6-bit dominant (Dominant) state so that it may be shown, When time until it restarts a synchronization becomes long when the numerals of a dominant state continue after the above-mentioned SOM, and the common difference by the difference in the bit length of a reference clock is between each major node, When the speed difference of the above-mentioned clock accumulated, it becomes impossible to have taken the bit synchronization and there was a problem of producing a bit error.
[0007]An object of this invention is to provide the multiplex transmission system which can take a bit synchronization certainly, without having been made in view of the above-mentioned problem, and being dependent on dispersion in the reference clock of each major node.
[0008]
[Means for Solving the Problem]If said transmitting major node detects an idle state of a multiplex transmission line and this idle state reaches predetermined time in this invention when transmitting data for every frame to a multiplex transmission line from a transmitting major node in order to solve the above-mentioned purpose, In a synchro system in a multiplex transmission system which a frame which has start numerals is transmitted to said multiplex transmission line, and a receiving major node detects these start numerals, and takes a synchronization, Said start numerals add a special bit pattern to the rear, and a multiplex transmission system which said receiving major node detects this special code, and retakes a synchronization is provided.
[0009]
[Function]A special bit pattern is added to the rear of the start numerals of the frame transmitted to a multiplex transmission line, and a synchronization is retaken in the standup of the above-mentioned bit pattern. Therefore, even if the same numerals as the above-mentioned start numerals continue after start numerals, time to retake a synchronization can become short, a synchronous gap can be prevented, and a synchronization can be taken certainly.
[0010]
[Example]The example of this invention is described based on the drawing of drawing 1 thru/or drawing 2. With the multiplex transmission system concerning this invention, it is NRZ (Non Return to Zero) to a modulation code. Using numerals, a staff bit is inserted in the above-mentioned NRZ code, and the digital transmission system which takes a synchronization by the above-mentioned staff bit is used.
[0011]The message frame concerning this invention removes the field of SOM (frame start numerals), and is drawing 3 (a). It is the same as that of the shown composition. So, the lineblock diagram which is one example of SOM concerning this invention is shown in drawing 1 here. 6 bits in which SOM breaks a staff bit rule in drawing 1 -- dominant or following the special code a -- passive (Passive) of 1 bit each -- and dominant or the special bit pattern b is established. Even if the special code a and identical codes of SOM continue after SOM, the above-mentioned bit pattern b is a rising edge of the above-mentioned bit pattern b, and it is arranged so that each major node may retake a synchronization and can prevent a synchronous gap.
[0012]In this example, the transmitting side will certainly carry out 1 bit inserting of the reversal numerals, if 5 bits of identical codes follow frame data, and a receiver removes

an insertion bit in a reverse procedure. Therefore, to the frame data on a multiplex bus, the end of passive ******** of 6 bits or more and a message can be judged easily. Next, operation of the multiplex transmission system concerning this invention is explained based on the lineblock diagram of the transmission systems of drawing 2. Here, it shall be connected to the common multiplex bus MB, and the major nodes 10, 20, and 30 shall transmit a message between the above-mentioned major nodes 10 and 20 and 30. When a passive state of 6 bits or more continues on the multiplex bus MB, it means that the multiplex bus MB is in an idle state, and each major nodes 10, 20, and 30 can start transmission of a message, when 6-bit PASSHIBU is detected on the above-mentioned multiplex bus.

[0013]In drawing 2, make the major node 10 into the node of the transmitting side, and let the major nodes 20 and 30 be the nodes of a receiver. If the idle state of the multiplex bus MB is detected, the transmitting side major node 10 starts transmission of a message, and sends out SOM which consists of the special code a and the special bit pattern b to the multiplex bus MB. The receiver major nodes 20 and 30 detect the standup of the special code a from the transmitting side major node 10, Or the standup of the special bit pattern b is detected, a bit synchronization is taken [a frame synchronization is taken by the above-mentioned rising edge,] by the above-mentioned rising edge, and the frame data following below is incorporated. [still] [passive and]

[0014]Therefore, since SOM of a message is made to constitute from a special code and a special bit pattern and a synchronization is retaken by the rising edge of the above-mentioned special bit pattern in this example, Even if the special code and identical codes of SOM continue after SOM, a synchronization can be taken certainly and the bit error accompanying the synchronous gap by clock common difference etc. and this can be prevented.

[0015]

[Effect of the Invention]If said transmitting major node detects the idle state of a multiplex transmission line and this idle state reaches predetermined time in this invention when transmitting the data for every frame to a multiplex transmission line from a transmitting major node as explained above, In the synchro system in the multiplex transmission system which the frame which has start numerals is transmitted to said multiplex transmission line, and a receiving major node detects these start numerals, and takes a synchronization, Without being dependent on dispersion in the reference clock of each major node, since said start numerals add a special bit pattern to the rear, said receiving major node detects this special code and a synchronization is retaken, a bit synchronization can be taken certainly and, thereby, the reliability of multiplex transmission can be improved.

CLAIMS

[Claim(s)]

[Claim 1]If said transmitting major node detects an idle state of a multiplex transmission line and this idle state reaches predetermined time when transmitting data for every frame to a multiplex transmission line from a transmitting major node, In a synchro system in a multiplex transmission system which a frame which has start numerals is transmitted to said multiplex transmission line, and a receiving major node detects these start numerals,

and takes a synchronization, A synchro system in a multiplex transmission system said start numerals' adding a special bit pattern to the rear, and said receiving major node's detecting this bit pattern, and retaking a synchronization.
[Claim 2]A synchro system in the multiplex transmission system according to claim 1 becoming passive [said special bit pattern] from dominant numerals.